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Very low dose myocardial perfusion imaging with 1 mSv using cadmium-zinc-telluride (CZT) cameras and Tc99m-sestamibi

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Background: Myocardial perfusion imaging is an essential tool for management of coronary artery disease but leads to relative high radiation exposure (average: 20 mSv, *Berrington de Gonzalez, Circulation 2010*) and contributes up to 20% of the estimated annual collective radiation dose. We previously published validation of new CZT cardiac cameras, improvement of diagnosis performances and reduction of dosimetry lower than 10 mSv with thallium (*JESFC 2011*).

Objectives: We used new cardiac CZT cameras to decrease to only 1 mSv the effective dose with technetium agents.

Methods: We prospectively studied 100 consecutive patients without previously known coronary artery disease referred for diagnostic stress myocardial perfusion imaging. We injected at stress a low dose of Tc99m-sestaMIBI (1.75 MBq/kg), performed immediate stress myocardial scan in 10 mn with a CZT camera GE DNM 530c. We practiced rest myocardial scan 4 hours later only when stress images were abnormal, with injection of a treble activity.

Results: Patients were 59 males and 41 females.There weight was 78±15 kg. They received at stress 135±30 MBq of Tc99m-sestaMIBI. Total and myocardial acquired counts were 1092±308 kcts and 317±91 kcts. Quality of scan was excellent in 82 cases and acceptable in other cases. The results were normal in 90 cases and abnormal in 10 cases (3 artifacts,4 ischemia and 3 unknown myocardial infarction scar). Normal stress ejection fraction was 68± 7%, end-diastolic and end-systolic volumes were 72±27 and 23±11 ml. The effective dose at stress was 0.79±0.08 mSv for men and 1.02±0.07 mSv for women. The rest activity (average 430 MBq) leads to an additional dose of 3.02 mSv for men and 3.89 mSv for women.

Conclusions: With reduced activities of Tc99m-sestaMIBI, CZT cameras give high quality imaging. It leads to a decrease of equivocal results and a low ratio of patients needing an additional rest scan. The effective dose is thus very low, less or equal to 1 mSv in most cases.

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Pro-adrenomedullin (MR-proADM) can predict short and long term mortality in STEMI patients

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Background: Midregional pro-Adrenomedulin (MR-proADM) appears to be a powerful predictor of adverse outcome after AMI when measured 3 to 5 days after symptoms onset.

Objectives: We sought to assess whether (MR-proADM) measured at admission would correlate with the outcome in ST-segment elevation myocardial infarction patient treated with primary PCI.

Methods: We measured plasma MR-proADM in 283 consecutive STEMI patients (74.8% men, mean age 64.2 ± 15 years) immediately after the sheath insertion and before the primary PCI. We assessed the relation between MR-proADM and mortality (in-hospital and 1year of follow-up) and compared them to the prognostic value of troponin I (peak value) and the TIMI risk Score for STEMI patients.

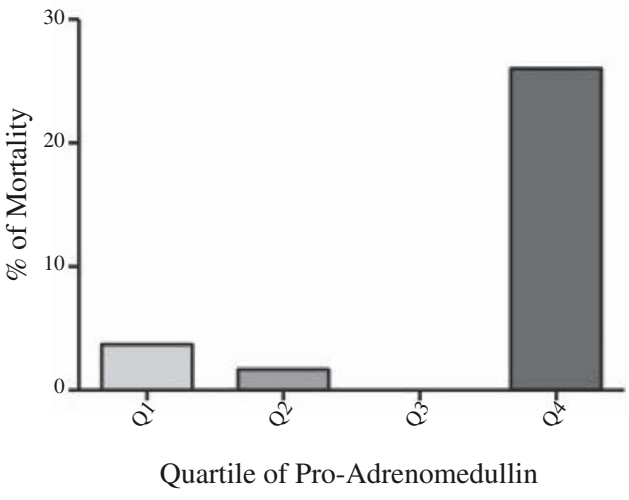
Results: All cause mortality was 4.5% at discharge and 7.3% at the end of the follow-up (365 days). The MR-proADM was increased in patients who died compared with survivors (median 1.27 nmol/l, IQR [0.99 to 3.16 nmol/l], vs. 0.53 nmol/l, range 0.39 to 0.68 nmol/l], $p < 0.0001$).

The areas under the receiver-operating characteristic curve for long-term survival (one year) for MR-proADM, Troponin I (peak value in µg/l) and TIMI Risk Score were 0.79 (0.64-0.95) p<0.001, 0.58 (0.49-0.68) p=0.06, and 0.67 (0.55-0.79) p=0.01 respectively.

Findings were similar for in-hospital mortality 0.77 (0.55-0.98) p=0.002 for MR-proADM.

Conclusions: Early measurement of MR-proADM during the acute phase of AMI is a powerful predictor of short and long term mortality in STEMI patients.

The MR-proADM may represent a clinically useful marker of prognosis during AMI.



Pro-ADM and death at 1 year

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Impact of the systematic use of DES on the clinical outcome in diabetic patients

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Background: In November 2003, DES were reimbursed by the belgian Health Insurance System for diabetic patients, based on their higher restenosis rate after BMS implantation and improved outcome in randomized trials.

Aim: To assess the impact of the systematic use of DES in diabetic patients on procedural management and clinical outcome (= stent thrombosis, TL revascularization and death).

Methods: We compared procedural data and outcome in consecutive series of 366 (1.1.2000% 1.11.2003) PCI procedures (hospital stays) by BMS versus 276 PCI procedures with at least one DES (1.11.2003% 30.6.2006) performed at our institution.

Results: Outcome data after hospital discharge are based on Kaplan-Meier survival curves.

Stent thrombosis includes definite, probable and possible cases.

Conclusion: In our consecutive series, the beneficial effect of systematic DES implantation on repeat TLR in diabetic patients was less impressive than expected, based on previous randomized trials. However, the rate of stent thrombosis was not increased. Overall mortality was not reduced (at 4 y.) despite better secondary prevention measures. Changes in revascularization strategies in diabetic patients (indications, procedural) may explain partially the reduction of the expected benefit by systematic use of DES in routine clinical practice in this single center all-comes registry.